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GEORGE BISHOP, Esq., Treasurer, in the chair.

Wm. Spottiswoode, Esq., 12 James Street; and
Josh. Rankin Stebbing, Esq., of Southampton,
were duly elected Fellows of the Society.

The newly-discovered comet will be found page 166.

THETIS.

On April 17, M. R. Luther, director of the Observatory of Bilk, near Düsseldorf, discovered a new asteroid, the 17th of the group. This planet has since received the name of *Thetis*.

1852.	Bilk M.T. h m s	App. R.A. ° ′ ″	App. Decl. ° ′ ″	No. of Obs.
April 17	10 37 39	180 38 24	+8 49 2	
20	10 26 28·0	180 12 38·4	8 57 12·0	14
21	10 0 43	180 4 59	8 59 27	
May 5	9 53 26·9	178 56 41·9	9 6 29·2	7
7	9 16 25·9	178 53 34·5	+9 3 49·7	3

BERLIN. (Dr. Brünnow and G. Rümker.)

1852.	Berlin M.T. h m s	R.A. ° ′ ″	Decl. ° ′ ″	Obs.
April 22	12 11 58·7	179 56 43·6	+9 1 18·7	10
23	10 57 49·3	50 5·7	3 22·7	12
25	12 15 57·0	36 41·9	6 18·2	15
26	11 10 17·3	179 31 4·2	+9 7 18·7	12

ALTONA. Equatoreal. (Dr. A. C. Petersen.)

1852.	Altona M.T. h m s	R.A. h m s	Decl. ° ′ ″	No. of Obs.
April 25	10 39 55	11 58 28·90	+9 6 6·3	6
26	9 33 22	11 58 9·01	+9 7 6·5	10

Assumed *apparent* place of Star of Comparison, $11^h\ 55^m\ 47^s{\cdot}04$ $+9^\circ\ 7'\ 57''{\cdot}1$.

* Owing to very serious illness, Mr. Hartnup has not been able to make his usual contributions to the present Number; he is, however, happily recovering.

In the present Number the Editor has included almost all the matter received up to the date of publication.

ALTONA. Meridian Circle. (M. Sonntag.)

1852.	Altona M.T. h m s	R.A. h m s	Decl. ° ′ ″
April 25	9 42 24	11 58 29·36	+9 6 2·5
26	9 38 4	11 58 5·38	+9 7 7·6

HAMBURG. Equatoreal. (M. C. Rümker.)

1852.	Hamburg M.T. h m s	R.A. ° ′ ″	Parx. ″	Decl. ° ′ ″	Parx. ″	Obs.	Star of Comp. h
April 23	10 35 13·2	179 50 10·7	+0·7	+9 3 18·0	+4·0	10	Weisse; XII, 16, 34
25	11 54 25·2	37 0·4	1·1	6 4·4	4·0	7	1
26	11 6 39·2	179 30 56·4	1·3	7 10·6	4·0	6	1
May 7	13 3 13·9	178 53 21·1	2·9	9 3 34·1	4·1	11	2
11	11 2 26·8	52 22·8	1·9	8 55 50·8	3·8	8	2
15	12 12 23·0	178 58 2·9	2·7	44 39·7	4·0	7	
16	11 40 53·0	179 0 33·3	2·5	41 26·9	4·0	10	
17	9 59 45·7	179 3 8·0	+1·4	+8 38 3·2	+3·8	6	

Mean Places of the compared Stars for Jan. 0, 1852.

No.	R.A. h m s	No. of Obs.	N.P.D. ° ′ ″	No. of Obs.
1	12 0 33·36	1	+9 4 30·9	1
2	11 55 0·80	3	+8 53 42·0	2

CAMBRIDGE. Northumberland Equatoreal. (Professor Challis.)

1852.	Green. M.T. h m s	R.A. h m s	Log $\frac{p}{P}$	N.P.D. ° ′ ″	Log $\frac{q}{P}$	No. of Comps.	Star.
April 26	13 20 1·8	11 58 1·89	+8·535	80 52 32·4	−9·8569	3	*b*
27	8 47 34·8	57 44·05	−7·916	51 49·2	9·8332	3	*b*
	9 33 16·1	43·02		53·9	9·8320	Meridian	
May 4	8 50 19·8	55 55·38	−7·392	52 12·2	9·8322	2	*q*
	10 51 39·3	54·19	+8·275	17·8	9·8387	6	*b*
5	10 51 46·5	11 55 45·51	+8·290	80 53 22·6	−9·8392	7	*b*

The star of comparison is Bessel (Weisse), xi^{h}, 944: Weisse's place is adopted.

Approximate Elements. By Dr. Brünnow.

	° ′ ″	
M	+ 303 57 38·6	1852, April 17·0, Berlin M.T.
π	259 48 29·3	
Ω	124 27 33·5	
i	5 37 40·9	
φ	7 47 29·1	
Log a	0·402348	
μ	884″·0650	

An ephemeris founded on these elements is omitted.

Rectangular Co-ordinates from Dr. Brünnow's Elements, referred to the Apparent Equinox, April 17. By Professor Temple Chevallier.

$$x = [0{\cdot}3970076] \sin (349^\circ\ 50'\ 44''{\cdot}1 + u) + 0{\cdot}0596252$$
$$y = [0{\cdot}3747225] \sin (261\ 42\ 17{\cdot}5 + u) + 0{\cdot}3179134$$
$$z = [9{\cdot}9515049] \sin (247\ 46\ 19{\cdot}5 + u) + 0{\cdot}1122336$$

Elements.

By M. E. Vogel, of the South Villa Observatory, Regent's Park, from the Observations at Bilk, April 17; Berlin, April 26; Liverpool, May 6.

M	= 306° 7′ 18″·33	May 6, 0^h, Berlin M.T.
π	260 28 28·72	Mean Equinox, 1852, Jan. 1.
Ω	125 45 24·14	
i	5 35 38·20	
φ	6 24 39·83	
Log a	0·3868301	
Log μ	2·9497615	
μ	932″·74200	

These elements represent the middle observation exactly.

Ephemeris.

At 9^h 36^m Berlin Mean Time.

1852.	R.A. h m s	Decl. ° ′	Log Δ.
May 18·4	11 56 25	+8 34·2	0·21307
19·4	56 40	30·3	
20·4	56 57	26·2	
21·4	57 15	22·0	
22·4	57 35	17·6	0·22302
23·4	57 56	13·0	
24·4	58 18	8·2	
25·4	58 41	+8 3·3	
26·4	59 6	+7 58·2	0·23298
27·4	11 59 33	53·0	
28·4	12 0 2	47·6	
29·4	0 32	42·0	
30·4	1 3	36·3	0·24296
31·4	1 35	30·4	
June 1·4	2 9	24·4	
2·4	2 45	18·2	
3·4	3 22	11·9	0·25291
4·4	4 1	+7 5·5	
5·4	12 4 40	+6 58·9	

1852.	R.A. h m s	Decl. ° ′	Log Δ.
June 6·4	12 5 20	+6 52·2	
7·4	6 2	45·4	0·26281
8·4	6 45	38·4	
9·4	7 29	31·3	
10·4	8 14	24·1	
11·4	9 1	16·8	0·27263
12·4	9 49	9·3	
13·4	10 38	+6 1·7	
14·4	11 28	+5 54·0	
15·4	12 9	46·2	0·28128
16·4	13 11	38·3	
17·4	14 4	30·3	
18·4	14 59	22·2	
19·4	12 15 56	+5 14·0	0·29176

By M. G. Rümker, founded on the Observations at Bilk, April 20; Berlin, April 28, and May 11.

	° ′ ″	
M	313 25 1·43	May 16·5, 1852, Berlin M.T.
ϖ	259 10 9·11	Mean Equinox, June 0·0, 1852.
Ω	125 3 4·63	
i	5 32 55·09	
φ	8 30 39·16	
Log a.....	0·3963126	
Log μ.....	2·9555377	

An ephemeris by M. G. Rümker, founded on the above elements, arrived after M. Vogel's ephemeris had been set up.

PSYCHE.

Dr. de Gasparis' last discovered planet has been named *Psyche*.

CAMBRIDGE. Northumberland Equatoreal. (Professor Challis.)

1852.	Green. M.T. h m s	R.A. h m s	Log $\frac{p}{P}$.	N.P.D. ° ′ ″	Log $\frac{q}{P}$.	No. of Comps.	Star.
April 8	9 34 51·4	9 50 25·81	+7·933	76 15 56·0	−9·7940	4	*a*
	11 17 36·3	25·06	+8·426	56·7	9·8138	1	*a*
10	10 10 0·1	50 14·51	+8·240	14 5·5	9·8000	7	*a*
12	8 25 2·0	50 9·45		12 41·6	9·7907	Meridian	
13	8 21 4·4	9 50 7·69		76 11 58·7	−9·7906	—	

The planet was very faint on the meridian on April 12. The star of comparison is H.C. 19589, and its adopted mean place for 1852·0, deduced from two transits and one circle observation taken at Cambridge, is as follows:—

R.A. $9^h\ 54^m\ 8^s{\cdot}55$ N.P.D. 76° 23′ 19″·7

BERLIN. (Dr. Brünnow and G. Rümker.)

1852.	Berlin M.T. h m s	R.A. ° ′ ″	Decl. ° ′ ″
April 20	10 31 13·9	147 38 39·9	+13 48 40·7
21	10 50 14·9	40 53·7	48 21·4
22	10 41 34·1	43 19·5	47 54·8
23	9 45 7·6	45 58·3	47 22·7
25	10 53 46·6	52 31·9	45 53·4
26	10 2 58·2	147 56 4·3	+13 45 6·2

HAMBURG. Equatoreal. (M. C. Rümker.)

1852.	Hamburg M.T. h m s	R.A. ° ′ ″	Parx. ″	Decl. ° ′ ″	Parx. ″	No. of Comp.	Comp. Star.
April 11	8 58 15	147 32 57·6	+0·3	+13 46 47·6	+2·2	6	1
16	8 46 31	32 52·5	0·3	49 1·2	2·2	6	1
23	8 59 14	46 6·2	0·7	47 33·0	2·1	10	1
25	9 31 8	52 20·9	1·0	45 53·9	2·2	9	1
26	10 16 30	147 56 11·1	1·3	44 59·6	2·2	8	2
May 6	10 15 22	148 47 27·4	1·5	30 46·0	2·2	4	2
7	9 50 13	148 53 55·6	1·3	28 40·4	2·1	4	2
11	10 11 20	149 22 31·8	1·5	20 8·4	2·2	12	2
15	10 58 22	149 55 11·7	+1·5	+13 9 40·6	+1·9	21	

Mean Places of the Compared Stars for Jan. 0, 1852.

	R.A. h m s	Decl. ° ′ ″	No. of Obs.
1	9 49 10·87	+13 51 33·0	2
2	9 58 39·78	+13 30 1·2	1

ROME. Meridian Circle. (Father Secchi.)

1852.	Rome M.T. h m s	R.A. h m s	Decl. ° ′ ″
April 5	8 54 25·0	9 50 52·25	+13 40
6	49 42·0	50 42·55	41 29·7
7	45 37·0	50 33·93	42 40·5
10	33 40·1	50 24·07	45 37·2
11	29 32·2	50 12·11	46 44·6
12	25 33·7	50 9·43	47 15·5
13	21 36·9	50 8·58	
15	13 45·8	50 9·29	48 35·5
18	8 2 8·7	9 50 19·92	+13 49 8·3

With Cauchoix's refractor and circular micrometer.

	Rome M.T. h m s	R.A. s	Decl. ′ ″	No. of Comps.
April 21	8 22 32·5	*+18·63	*+17 38·8	4
23	8 24 8·7	39·56	16 34·5	5
24	9 28 7·2	*+52·44	*+15 47·1	4

Not corrected for parallax.

Apparent Places, by meridian circle, of the Star of Comparison.

	R.A. h m s	Decl. ° ′ ″
April 21	9 50 23·81	+13 31 0·6
24	9 50 23·97	+13 30 59·2

Elements.

By M. E. Vogel, of the South Villa Observatory, from the normal place of March 24, the Cambridge and Liverpool places of April 8, and the Liverpool place of April 24.

	° ′ ″	
M	= 295 4 40·90	March 24·0, Berlin M.T.
π	244 53 19·03	Mean Eq^{x},
Ω	149 53 32·51	1852, Jan. 1.
i	2 42 15·11	
φ	11 35 18·43	
Log a	0·5254586	
Log μ	2·7418187	
μ	577″·85480	

Calculated — Observed $d\,l = +0''\cdot03$

$d\,b = +0''\cdot01$

Ephemeris. By M. E. Vogel.

For 9^{h} 36^{m} Berlin M.T.

1852.	R.A. h m s	Decl. ° ′	Log Δ.
May 16·4	10 0 56	+13 3·5	0·46073
17·4	1 33	+13 0·4	
18·4	2 12	+12 57·2	
19·4	2 52	53·9	
20·4	3 23	50·6	0·46786
21·4	4 15	47·1	
22·4	4 58	43·5	
23·4	5 42	39·8	
24·4	6 27	36·0	0·47485
25·4	7 12	32·1	
26·4	7 58	28·2	
27·4	8 45	24·2	
28·4	9 33	20·1	0·48168
29·4	10 21	15·9	
30·4	11 10	11·7	
31·4	12 0	7·4	
June 1·4	12 50	+12 2·9	0·48833
2·4	13 41	+11 58·4	
3·4	14 33	53·8	

1852.	R.A. h m s	Decl. ° ′	Log Δ.
June 4·4	10 15 26	+11 49·1	
5·4	16 20	44·3	0·49480
6·4	17 15	39·4	
7·4	18 11	34·5	
8·4	19 7	29·5	
9·4	20 3	24·5	0·50108
10·4	21 0	19·4	
11·4	21 57	14·1	
12·4	22 55	8·7	
13·4	23 54	+11 3·3	0·50717
14·4	24 53	+10 57·8	
15·4	25 52	52·3	
16·4	26 52	46·7	
17·4	10 27 52	+10 41·0	0·51305

Mr. G. Rümker has calculated the following Elements on the Naples places of March 19, 29, and the South Villa place of April 4:—

M	280 ° 25 ′ 21·5 ″	1852, April 1·0 Berl. M.T.
π	253 56 20·8	Mean Equinox,
Ω	150 14 11·7	Jan. 0·0, 1852
i	2 43 8·1	
φ	7 42 56·3	
Log a	0·4965374	
Log μ	2·8052005	

An ephemeris accompanied these elements.

EGERIA.

HAMBURG. Equatoreal and Meridian Circle. (M. C. Rümker.)

1852.	Hamburg M.T. h m s	R.A. ° ′ ″	Par^{x}. ″	Decl. ° ′ ″	Par^{x}. ″	No. of Comps.	Compared Star.
Feb. 19	9 52 57·6	184 34 26·7	−3·3	+23 14 37·7	+3·6	4	40
20	9 19 39·3	24 4·7	3·5	19 16·2	3·9	15	40
22	10 24 51·6	184 0 57·4	3·0	30 1·8	3·4	17	40
23	8 58 5·2	183 49 46·4	3·5	34 46·4	3·8	24	40, 41
24	9 2 38·5	37 24·7	3·5	39 50·0	3·8	12	39, 41
25	8 49 42·3	183 24 50·5	3·6	44 33·6	3·8	12	39
27	8 36 40·2	182 58 35·5	3·6	23 53 50·3	3·9	23	38
29	9 30 25·8	30 14·4	3·3	24 2 39·4	3·5	10	35, 37, 38, 39
March 1	8 54 18·2	182 16 14·6	3·5	6 35·0	3·7	11	37, 38
4	9 14 42·3	181 31 15·3	3·3	17 42·3	3·6	16	33
8	8 30 56·7	180 28 57·6	3·4	29 20·8	3·6	16	32
12	8 23 19·1	179 23 50·3	3·4	37 12·9	3·6	13	30, 31, 32
13	9 35 19·5	179 6 23·9	−2·6	+24 38 36·5	+3·2	14	30, 31, 32

1852.	Hamburg M.T. h m s	R.A. h m s	Parx.	Decl. ° ′ ″	Parx.	No. of Comps.	Compared Star.
Mar. 14	12 24 15·0	178 47 54·5	0·0	+24 39 44·0	+2·8	...	Mer. Circle
15	10 28 9·6	178 32 40·4	−1·8	40 21·3	3·6	6	27, 28, 30, and Bess. Z. 503, No. 26.
	12 19 13·0	31 15·4	0·0	40 31·0	2·8	...	Mer. Circle
16	8 31 41·2	178 17 28·4	−3·1	40 47·6	3·4	5	28, 30, Bess. Z. 503, No. 26
17	12 9 9·0	177 58 12·2	0·0	41 4·3	2·8	...	Mer. Circle
19	7 55 18·2	28 14·4	−3·3	40 32·4	3·5	5	24, 25, 27
	11 59 6·0	25 19·1	0·0	40 27·1	2·8	...	Mer. Circle
20	8 30 36·3	177 11 24·4	−2·9	39 57·2	3·3	5	25, 27
	11 54 5·2	9 3·4	0·0	39 42·4	2·8	...	Mer. Circle
21	8 23 58·6	176 55 7·8	−2·9	38 54·2	3·3	9	25
	11 49 4·4	52 45·3	0·0	38 45·4	2·8	...	Mer. Circle
22	8 27 54·2	38 57·2	−2·9	37 36·7	3·2	17	25
24	8 19 14·5	176 7 6·2	−3·0	34 12·6	3·3	13	24
	11 34 6·6	5 7·9	0·0	34 6·1	2·8	...	Mer. Circle
25	8 7 2·1	175 51 33·9	−2·9	32 2·2	3·3	6	24
	11 29 7·6	49 18·7	0·0	31 46·2	2·8	...	Mer Circle
28	8 14 43·0	175 5 50·6	−2·6	23 40·3	3·2	12	23, Bess. Z. 353, No. 64
	11 14 18·5	3 49·7	0·0	23 28·5	2·7	...	Mer. Circle
30	8 24 6·0	174 36 41·4	−2·4	16 46·0	3·1	4	23, Bess. Z. 353, No. 64
April 2	9 33 20·9	173 54 36·8	−1·2	24 4 10·2	2·8	13	Bess. Z. 353, No. 61
	10 49 57·7	53 19·9	0·0	3 54·9	2·7	...	Mer. Circle
5	10 35 36·6	173 14 52·4	0·0	+23 48 50·8	+2·7	...	Mer. Circle

Mean Places of Stars for Jan. 0, 1852, in the geocentric orbit of *Egeria*, (with which the planet has been compared), deduced from observations with the Hamburg meridian circle.

No. of Star.	R.A. h m s	Decl. ° ′ ″	No. of Star.	R.A. h m s	Decl. ° ′ ″
1	11 12 2·22	+19 53 28·4	23	11 39 20·29	+24 32 29·7
2	12 25·89	21 21 39·8	24	45 13·77	24 36 14·3
3	14 7·58	20 16 59·0	25	46 54·61	24 38 8·8
4	17 19·51	23 27 42·8	26	48 50·22	24 17 50·4
5	18 26·68	20 17 47·9	27	51 29·42	24 43 48·5
6	18 26·99	21 12 46·0	28	52 20·98	24 46 1·8
7	18 41·15	21 20 0·7	29	55 18·90	25 0 4·2
8	19 20·29	20 30 25·9	30	11 56 37·55	24 56 35·8
9	22 21·61	23 25 31·9	31	12 0 29·49	24 31 32·1
10	24 14·96	22 40 35·9	32	0 34·96	24 42 50·1
11	25 5·96	22 48 16·8	33	6 56·93	24 29 23·8
12	25 35·91	22 23 41·8	34	8 50·96	24 46 5·6
13	26 53·33	24 9 58·7	35	10 24·27	23 40 35·1
14	28 55·16	21 12 22·4	36	11 8·76	24 8 20·0
15	30 56·26	23 11 54·6	37	11 7·05	23 56 33·2
16	30 59·81	24 8 53·2	38	11 50·22	23 51 25·5
17	31 8·28	23 36 41·7	39	13 14·24	23 44 13·7
18	32 31·58	22 12 24·1	40	14 56·73	23 17 9·5
19	33 4·94	22 10 26·3	41	15 19·27	23 41 43·7
20	34 46·62	24 43 20·7	42	17 37·20	23 45 6·5
21	36 4·49	24 49 52·9	43	12 22 55·08	+23 14 41·9
22	11 36 53·13	+23 11 55·4			

FLORA.

HAMBURG. (M. C. Rümker.)

1852.	Hamburg M.T. h	m	s	R.A. °	′	″	Parx. ″	Decl. °	′	″	Parx. ″	No. of Comps.	No. of Compared Star, vide infra.
March 12	10	8	6·3	190	32	45·2	−2·5	+5	24	47·2	+4·3	4	18, 20; Weisse, xii, 838
13	10	28	9·0		19	18·6	2·3		33	1·9	4·3	4	15
14	11	7	44·9	190	5	29·6	1·7		40	42·9	4·3	7	15, 16
15	11	6	1·8	189	51	55·1	1·6		48	44·5	4·3	4	15, 16
16	8	56	21·3		39	17·3	3·0	5	55	19·8	4·4	1	15, 16
17	9	16	9·5	189	25	6·5	−2·8	6	3	14·2	4·4	5	15, 16; Weisse, 593; Lalande, 23714
19	8	56	52·6	188	56	46·2	−2·9	6	18	12·7	4·4	6	11; Weisse, 572, 576, 593; Lalande, 23714
	12	44	54·8		54	24·9	0·0		19	23·8	4·2	...	Merid. Circle
20	9	36	59·9	188	41	51·8	−2·5	6	26	2·5	4·3	4	13; Weisse, 572; L. 23692
	12	40	1·6		40	2·6	0·0		26	52·0	4·2	...	Merid. Circle
21	9	14	57·5	188	27	34·0	−2·6	6	33	34·5	4·3	4	Weisse, 572; Lal. 23692
	12	35	7·8		25	30·3	0·0		34	13·7	4·2	...	Merid. Circle
24	12	20	24·2	187	41	27·5	0·0	6	35	52·5	4·2	...	— —
25	9	15	32·7	187	28	39·0	−2·7	7	2	9·7	4·3	4	12; Weisse, 536, 543
	12	15	29·6		26	39·0	0·0		2	53·1	4·1	...	Merid. Circle
28	9	25	6·1	186	43	58·1	−2·7	7	22	44·1	4·3	6	Weisse, 364, 367
	12	0	44·8		42	19·9	0·0		23	8·2	4·1	...	Merid. Circle
April 2	11	36	14·6	185	29	28·9	0·0	7	53	58·1	4·0	...	— —
5	11	22	21·9	184	58	8·2	0·0	8	11	51·3	4·0	...	— —
7	11	11	57·4	184	19	50·5	0·0	+8	20	31·3	+4·0	...	— —

Mean Places of the Compared Stars and of Stars in the Apparent Orbit of the Planet for Jan. 0, 1852.

No. of Star.	R.A. h	m	s	Decl. °	′	″	No. of Star.	R.A. h	m	s	Decl. °	′	″
1	12	6	56·94	+5	8	12·3	11	12	32	22·08	+6	15	34·0
2		6	57·15	4	28	46·7	12		33	48·78	7	2	3·9
3		11	49·10	7	49	41·5	13		35	15·43	6	27	27·8
4		17	52·75	8	5	43·9	14		38	46·94	6	20	34·5
5		20	37·33	7	54		15		40	39·60	5	56	43·9
6		22	39·07	6	41	43·7	16		41	54·87	5	58	57·9
7		23	11·30	6	20	4·5	17		44	25·78	5	36	28·9
8		25	58·86	7	2		18		46	8·82	5	2	39·2
9		29	18·47	8	44	52·5	19		46	13·08	5	32	53·9
10	12	30	35·62	+6	26	58·2	20	12	47	51·06	+5	23	5·7

COMET, 1852, I.

A comet was discovered at Marseilles on May 15, by M. Chacornac, who describes it as "a small and very faint comet, rather diffuse and without tail or nucleus." Its approximate place was, very rudely,

1852.	Marseilles M.T. h m	R.A. ° ′	Decl. ° ′
May 15	14 20	338 30	+66 0
16	15 20	338 0	+68 50

This comet was discovered, *independently*, by Dr. Petersen at Altona, May 17.

ALTONA. (Dr. Petersen)

1852.	Altona M.T. h m s	R.A. ° ′ ″	Decl. ° ′ ″	No. of Obs.
May 17	11 43 24·5	337 55 2·4	+71 13 4·4	4
18	11 20 3·7	337 24 17·2	73 47 5·9	4
19	12 9 40·6	336 39 12·2	+76 33 50·6	4

HAMBURG. (M. C. Rümker.)

1852.	Hamburg M.T. h m s	R.A. ° ′ ″	Decl. ° ′ ″	No. of Obs.
May 18	11 48 29·6	337 23 39·6	+73 49 42·6	3
19	11 58 34·0	336 40 10·3	+76 32 44·3	3

BERLIN.

1852.	Berlin M.T. h m s	R.A. ° ′ ″	Decl. ° ′ ″	No. of Obs.
May 19	13 4 48·7	336 38 15·6	+76 38 45·5	10

Elements.

By M. A. Sonntag, from the three Altona observations.

T	1852, April 18·6502, Berlin M.T.	
π	280 55 50	Apparent
Ω	313 40 22	Equinox.
i	49 8 37	
Log q	9·94938	Motion Retrograde.

These elements have some resemblance with those of 1827, II, or No. 148, in Professor Galle's Catalogue.

Ephemeris.

For Berlin Mean Midnight.

1852.	R.A. ° ′	Decl. ° ′	Log Δ.
May 18·5	337 24	+73 50	9·9191
20·5	335 34	79 9	9·9266
22·5	330 40	84 14	9·9371
24·5	288 35	88 40	9·9501
25·5	196 11	88 9	9·9574
26·5	177 5	86 6	9·9651
28·5	168 57	81 57	9·9815
30·5	166 35	78 3	9·9994
June 1·5	165 31	74 47	0·0179
3·5	164 57	+71 9	0·0368

ENCKE'S COMET.

HAMBURG. Equatoreal. (M. C. Rümker.)

1852.	Hamburg M.T. h m s	R.A. ° ′ ″	Parx. ″	Decl. ° ′ ″	Parx. ″	No. of Comps.
Feb. 18	7 43 55·5	0 54 8·7	+4·3	+8 39 58·8	+5·8	10
19	7 20 41·6	1 22 39·6	4·3	8 47 20·3	5·6	7
20	7 11 11·7	1 51 11·4	4·3	8 53 48·7	5·8	17
23	7 17 17·4	3 17 49·8	4·6	9 10 47·7	6·0	20
24	7 17 23·8	3 45 55·6	4·6	9 15 19·6	6·1	9
25	7 49 44·2	4 14 11·1	4·8	9 18 23·0	6·3	4
27	7 5 23·8	5 23 49·6	4·9	9 32 40·1	6·4	5
Mar. 1	7 24 15·5	6 15 55·4	5·3	9 13 43·1	7·0	13
2	7 5 16·4	6 34 46·1	5·5	9 6 58·3	7·1	3
4	7 18 27·6	7 4 31·9	5·7	8 43 25·5	7·4	7
5	7 6 5·2	7 13 50·0	5·9	8 26 31·9	7·7	7
8	7 6 56·5	7 9 52·6	6·3	7 5 56·0	8·2	2
9	7 2 14·6	7 1 36·7	+6·6	+6 45 54·8	+8·7	1

The parallax annexed has not yet been applied. The places of the compared stars have mostly been deduced from the Hamburg meridional observations. See *Monthly Notices*, vol. xii. No. 5.

Apparent Places of the Compared Stars.

	R.A. h m s	Decl. ° ′ ″		R.A. h m s	Decl. ° ′ ″
Jan. 20	23 12 46·56	+4 34 20·8	Feb. 25	0 19 14·06	+9 12 37·9
	14 29·58	4 31 31·7		20 39·46	22 37·8
22	23 20 42·47	5 15 32·2	27	0 21 51·23	9 33 54·5
	55·02	4 59 30·7	Mar. 1	0 26 29·27	9 29 11·4
26	23 22 48·81	5 36 31·1	2	0 26 29·27	9 29 11·4
27	23 22 48·81	5 36 31·0	4	0 29 56·22	8 49 24·5
Feb. 18	0 4 10·52	8 18 51·9		33 32·10	32 39·9
19	0 7 46·09	8 55 35·0	5	0 33 32·09	8 32 39·9
20	Idem.		8	0 36 38·81	6 57 31·5
23	0 12 50·26	9 6 45·0	9	0 40 59·07	+6 46 33·2
24	0 12 50·25	9 6 44·9			
	19 14·06	19 37·9			
	0 20 39·46	+9 22 37·8			

Description of an Eye-piece for viewing the Sun, &c., with Remarks upon the Solar Spots and other Phenomena. By the Rev. W. R. Dawes.*

The principal peculiarity of this eye-piece consists in a metallic slide, with perforations of different sizes, which crosses the eye-tube

* Mr. Dawes explained the construction of this eye-piece at the meeting, and exhibited drawings of the solar spots as seen by its means. As the memoir will appear in the 4to. volume, a brief abstract is considered sufficient for this place.

at right angles, just at the focus of the object-glass. There are contrivances, which can easily be imagined, for rapid manipulation, and though the slide is, of course, greatly heated when the sun is viewed, the conduction is cut off by interposing a plate of ivory. The perforations vary in diameter from 0·5 to 0·0075 of an inch, and, with a small field, single lenses are preferred to complicated eye-pieces. Mr. Dawes finds that, in general, apertures which exceed 0·3 inch cannot be safely used for a long time under a hot sun. Where the usual proportions are retained between the aperture and focal length of an object-glass (seldom exceeding 1 to 16 in large telescopes), a focal diaphragm of 0·3 inch transmits a portion of the sun's image, the size and heat of which is nearly equivalent to that of the whole image of the sun in a refractor of 32 inches focal length, and of 2 inches aperture.* This may usually be employed without injury to the dark glasses, and the field is quite large enough for sweeping over the sun's disk in searching for spots or other phenomena. In careful scrutinies, the suitable aperture must be employed. In some very large spots, the nuclei alone may thus be examined, without any disturbance from the bright surface.

"By this mode of observation I have ascertained the existence of a stratum of comparatively faint luminosity, which, as far as I know, has not been previously noticed. For this I would propose the appellation of *the cloudy stratum*. Its appearance gives the impression of considerable depth below the second luminous stratum which forms the *shallow*, or *penumbra*, usually seen round the nucleus of a spot; and from all the examinations I have hitherto made, it seems to me probable that it is not self-luminous, but of such a nature as to absorb a vast quantity of light, and reflect very little. Its faint illumination is rarely uniform, presenting rather a mottled or cloudy surface; and occasionally some small patches are very decidedly more luminous than the rest, though still incomparably less bright than even the stratum forming the penumbra; from which it also differs essentially in being destitute of the striated or ridged appearance so frequently presented in that stratum.

"In all spots of considerable size, and in many small ones, a *black opening* is perceivable in the cloudy stratum. In no instance have I perceived any light in these openings which exceeded the illumination of the earth's atmosphere by the sun's rays. It is obvious that any degree of light inferior to this cannot be rendered visible by any contrivance we can employ; just as the red projections from the sun's border cannot be seen except when the solar illumination of our atmosphere is nearly extinguished by the intervention of the moon. In order to obtain a measure of this illumi-

* In the observations of the solar eclipse of July last, Mr. Lassell found that his dark glasses would bear an aperture of 2 inches, with a focal length of 32·5 inches, after they had been carefully heated over a lamp. With an aperture of 2·55 inches, "the dark glasses broke with most alarming rapidity." At the same place, with a telescope of 42 inches focus and 2·75 aperture, Mr. Williams had dark glasses cracked which had been in frequent use for five years.

nation of the atmosphere, and to ascertain the limit which it sets to our researches, I have usually directed the telescope, with a very small field, to the sky close to the sun's edge, using the lightest shade of darkening glass which my eye could comfortably bear. Then, using the same shade, the telescope is directed with the smallest diaphragm to the dark part of a large spot. In this way the cloudy stratum will in general become visible, frequently occupying by far the greater part of what has been hitherto considered the *nucleus* of the spot, and imagined to be, in fact, the body of the sun itself. A portion of it, however, will commonly be found to appear perfectly black, whence we may conclude that, if luminous at all, it is less so than our own atmosphere when illuminated by the direct rays of the sun. To this black part only the appellation of *nucleus* appears to be strictly applicable." See the figure below marked January 17, which consists of the penumbra, the cloudy stratum, and the true nucleus.

A remarkable instance of *rotatory* motion was observed in a spot which was sketched on January 17 and January 23.

The rotation was not of the smaller round the larger portion. "*The whole spot had rotated round the small black nucleus.*"

On examining the surface of the sun carefully, using a very small field, Mr. Dawes is persuaded that "the apparent rapid fluctuation of the porous structure is not real, but the effect of disturbance in our own atmosphere."

Mr. Dawes states his conviction of the superiority of large apertures with high powers in viewing the sun, which this reduction of the field makes easy. The *faculæ*, too, are seen far better with large apertures, especially when the power is not proportionally high.

"These are best seen near the east and west edges of the sun's disk, where they give the impression of narrow ridges, whose sides are there presented to view. They usually lie nearly in the direc-

tion of a circle of latitude on the sun's surface, and are rarely high enough to be seen as actual projections from his limb. On one occasion, however, the 22d of January last, I had an opportunity of observing a satisfactory confirmation of the idea that they are ridges, or heapings up of the luminous matter; and as the requisite circumstances are extremely rare, I will advert more particularly to the observation. A large bright streak, or *facula*, was observed to run, as usual, nearly parallel to the sun's edge for some distance, and very near it; and then to turn rather abruptly towards the edge and pass over it. The limb was at times very well defined; and when it was most sharp and steady, the bright streak was seen to *project slightly beyond the smooth outline of the limb*, in the manner of a mountain ridge nearly parallel to the sun's equator."

This eye-piece was applied to Mr. Lassell's 20-foot reflector last September, and the sun was examined with the whole of the 24-inch mirror. The eye-piece did not become more than sensibly warm after two hours' exposure to a bright sun.

Mr. Dawes points out the utility of this contrivance in examining the surface of the moon, in observing the occultations of small stars, and the eclipses of *Jupiter's* satellites, and in observing or detecting the faint satellites of planets. By such means, too, *Venus* and *Mercury* may be more pleasantly observed when near the sun; and as the author remarks, "to the practised observer such applications will readily occur," and need not be here insisted on.

Mr. Dawes' eye-piece was constructed by Mr. Dollond according to Mr. Dawes' directions.

Micrometrical Measurements of the Binary Star ξ Ursæ Majoris, and the Double Star Struve 1263, made at the Observatory, Whitehaven. By J. F. Miller, F.R.S.

ξ Ursæ Majoris. Magnitudes, 4,5; 5,5. Colours, both white.

Reference.	Position.	Weight.	No. of Obs.	Distance.	Weight.	No. of Obs.	Epoch.
	° ′			″			
63	122 11	3	9	2·883	3	8	1852·066
66	122 35	3	8	2·859	3	8	·076
67	123 5	1	7				·112
68	122 27	3	8	2·886	2	6	·133
70	122 22	3	8	2·867	2	8	·136
75	121 41	3	8	2·912	3	8	·161
77				2·944	3	9	·169
80	122 16	4	8	2·935	2	5	·180
Means	122 17	20	56	2·898	18	52	1852·129

63. Jan. 24, 1852. Distances between clouds. This is only the third clear night we have had since Dec. 23, 1851.

67. Encke's comet seen at 7 P.M. Midnight; stars dance perpetually, and definition bad; no dependence can be placed upon this set of positions.

70. A most brilliant aurora, covering three-fourths of the sky; stars dim in consequence.

80. Moon one day past full, but at a low altitude: 11^h to 13^h. This being the last set which I intend to take this season, nearly two hours were devoted to the positions, and extraordinary care bestowed upon each individual measure. I therefore consider the mean of this series to represent the angle as exactly as my skill and means will permit.

ξ *Ursæ* is certainly one of the most interesting and remarkable of the binary systems, and it has, perhaps, been more fully and satisfactorily examined than any other. The following *resumé* of its history shows that it has performed an entire revolution and an eighteenth part of a second cycle since its angular position was first noticed by Sir William Herschel in the spring of 1780, seventy-two years ago. The angular velocity is now diminishing, a necessary consequence of the increase in distance between the companion sun and its primary.

	Position.	Distance.	Epoch.
	° ′	″	
Herschel I.	143 47	3·50	1780·33
Struve	276 35		1820·13
Herschel II. and South	258 27	2·81	1823·29
Struve	238 75	1·747	1826·20
—	213 59	1·671	1829·35
—	195 94	1·750	1832·41
—	184 10	1·875	1834·44
Dawes	171 37	1·920	1836·27
—	165 97		1837·36
Struve	160 38	2·260	1838·43
Smyth	156 9	2·000	1839·23
—	143 2	2·30	1843·16
Struve	140 52	2·526	1844·778
—	138 49	2·620	1846·365
—	131 50	2·700	1847·407
—	128 43	2·752	1848·406
Miller	122 17	2·898	1852·129
Fletcher	119 46	2·924	1852·197

Struve, 1263. Magnitudes, 9; 9,5. Colours, yellowish white.

Reference.	Position.	Weight.	No. of Obs.	Distance.	Weight.	No. of Obs.	Epoch.
	° ′			″			
72	14 46	2	8	20·105	1	10	1852·148
74	15 15	2	9	20·346	1	4	·150
76	15 48	4	8	20·941	4	8	·161
79	16 12	3	8	21·133	2	4	·169
84	16 8	2	3	20·786	3	8	·191
85	16 10	5	8	21·220	5	8	·194
Means	15 50	18	44	20·934	16	42	1852·169

84. Distances taken first; it became clouded before positions were completed.

85. The definition (which has long been very indifferent), is much improved,

and on the whole these are the best observations which I have obtained of this star. There are three other very small adjacent points, visible only in a dark field. This double star bears but a slight degree of illumination, and a pretty bright night is requisite to bisect the stars accurately in distance.

Subjoined are M. Struve's prior measures :—

	Position.	Distance.	Epoch.	Nights.
	° ′	″		
Struve	359 00	4·86	1828·36	1
—	4 12	5·43	1829·36	2
—	4 95	7·08	1831·31	2
—	7 27	7·455	1832·33	2
—	8 00	7·973	1833·29	3
—	8 40	8·933	1834·36	3
—	9 29	9·595	1835·35	4
—	9 60	10·325	1836·41	2
Miller	15 50	20·934	1852·17	6

On projecting the above measures, it becomes evident that the stars are not physically connected. The great and rapid increase in distance is doubtless the effect of very considerable proper motion in one of the components, and hence this object seems worthy of a rigid scrutiny with the large meridian instruments in different national observatories. This star presents another example that apparent magnitude or lustre is not always, if indeed generally, an indication of proximity to the solar system, and furnishes a hint that in searching for proper motion and sidereal parallax, the stars invisible to the naked eye should by no means be neglected.

March 19. We have now had an uninterrupted continuance of fine weather for more than a month, and a large proportion of clear bright evenings and nights ; yet there has not been a single night in all that period, wherein the air was in a really satisfactory state for astronomical purposes. The stars have been affected by a constant tremor, the definition has been very indifferent, and on many evenings (clear to the eye), so extremely bad, that, as far as micrometrical measurements are concerned, the sky might as well have been covered with clouds. The peculiar flickering or twinkling, which is usually confined to the brighter stars, has of late palsied the whole visible heavenly host almost without intermission. So long a continuance of wretched astronomical weather, with a clear sky, I never remember. The year 1852 has, so far, been most unpropitious to the labours of the astronomer. Rain fell almost without intermission till the 17th of February,* and from that time up to the present, during which the weather has been of the most opposite description (not a drop of rain having fallen), unfavourable atmospheric influences of a different character have proved almost equally fatal to the successful prosecution of delicate astronomical work.

March 29.† With the exception of Monday the 22d, when 0·105 inch of rain fell, the fine, dry, calm weather has continued uninterrupted since the last note was written. The atmosphere, when clear, militates as strongly as ever against the astronomer. Probably the perpetual dancing and moulding of the stars is owing, in a great measure, to the excessive dryness of the lower strata of the air.

During the last ten days, the dew-point has occasionally been as much as 17°, 18°, and even 20°·8, below the temperature of the air. With a single exception, we have now had forty-one days without rain, a circumstance probably without a parallel in the memory of the existing generation in this district.

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* During this period (Jan. 1st to Feb. 17th), 11·56 inches descended at Whitehaven, and 47·70 inches at Seathwaite in the Lake district.

† Some rain fell in the course of the night, 29th–30th.

Opposition of Mars, 1851–1852, *observed at the Cape of Good Hope*. By Mr. Maclear.

This memoir contains a numerous series of observations with the mural circle of *Mars*, and the stars in the *Ephemeris of the Stars proper to be observed with Mars near the opposition of the planet in* 1852.* The refraction is computed and applied, and there are 46 days between December 22, 1851, and February 28, 1852, on which observations have been made.

Mars in Opposition in 1852. By Mr. Warren De la Rue.†

"Since October 17, 1851, when I made the drawing of *Mars*, which at a former meeting I presented to the Society, I have repeatedly examined the planet with my thirteen-inch Newtonian, and on most occasions have been struck with the distinctness of the white spot surrounding the north pole; but I never saw the details on its surface so vividly defined as on January 4, xiv^h, and January 25, xii^h, when I made the drawings which I have now the honour of presenting to the Society, and which I believe to be as faithful delineations of the aspect of *Mars* at these epochs, as my pencil, unaided by micrometrical measurements, could produce.

"On reference to the drawings, it will be remarked that the northern white spot extended to about the same parallel of latitude at both periods (39° from the limb), and that its outline was indented and irregular; and it will be also perceived that the south polar regions, though paler in colour than the general ruddy tint of the planet, were not white.

"On the 4th of January there existed, a little to the east of the planet's centre, a dark stripe which, running north and south, divided the disc into two unequal halves; but before reaching the poles it spread eastward and westward, forming two broad irregular zones, the southern zone being the darker of the two, and the northern becoming paler as it approached the white spot.

"At the time of observation on the 25th, 20 days 22 hours had elapsed since that on the 4th, the planet had therefore completed twenty rotations and $\frac{140}{360}$ths, so that the central dark streak, visible on the 4th, by moving through 140° had become invisible; whilst the eastern limb of the 4th had nearly reached the western limb of the planet's disc visible on the 25th. Referring to the drawing for the latter date, there will be perceived in the south-west quadrant, three distinct irregular dark markings surrounded by whitish boundary-lines to which I would wish to direct particular attention, as many similar white streaks, as well as minute dark spots, were visible on the surface of the planet; but they flitted in and out of view with such tantalising rapidity, that it was impossible for me

* *Nautical Almanac*, 1852, p. 565 et *seq.*

† Along with this notice Mr. De la Rue presented two very beautiful drawings of *Mars*, which may be seen at the apartments.

to record them. In the north-west quadrant there existed a broad irregular marking running north and south, and spreading westward along the boundary of the northern white spots."

"The night of the 25th was even finer than that of the 4th, and the telescope and atmosphere being both in good condition the image of the planet was scarcely impaired by any false light, but presented during the hour occupied in making the sketch, a continuous impression of hard and distinct markings, which appeared to be inconsistent with the supposition that the configuration could be due to a clouded atmosphere."

On the Parallax of β Centauri. By Mr. Maclear.

The observations on which this investigation is founded were made between July 29, 1842, and October 28, 1844, under the same circumstances, and nearly at the same time, with a portion of the observations of *α Centauri*, published in Vol. xx. of our *Memoirs*. The result is not to be deemed conclusive, but it has sufficient weight to make it of considerable positive value. A new series of observations has been commenced since, with the systematic circumspection demanded by such researches, but which was not previously practicable.

The mode of observation, computation, &c. is the same as that described in the *Memoirs*, vol. xx.

It does not appear that *β Centauri* has any *decided* proper motion. The mean N.P.D. for Jan. 1, 1843, is 149° 36′ 41″·6.

By 137 observations of *β Centauri*, Mr. Maclear finds,—

Parallax *β Centauri*	= 0″·47	Probable Error	0″·044
Constant of Aberration	= 20″·59	— —	0″·049

Errata in Mr. Maclear's Memoirs, Vol. XX. Roy. Ast. Soc. Mem.

Vol. xx. page 52, column B.A.C. *for* 4339, *read* 4399.
— — — 54, line 13 from top, R.A. of Rümker, *for* $14^h\ 36^m\ 34^s{\cdot}5$, *read* $14^h\ 36^m\ 44^s{\cdot}5$.
— — — 55, line 16 from top, *for* $15^h\ 0^m\ 5^s{\cdot}9$, *read* $15^h\ 0^m\ 5^s{\cdot}59$.
— — — 25, Oct. 21, *for* reduction 22″·84, *read* 23″·84.
— — — — — — *for* 127° 30′ 15″·60, *read* 127° 30′ 14″·60.

Extracts of a Letter from Lieut. Gilliss, U.S.N.

"Santiago de Chile.

"The weather continues to favour us in one sense, having enabled me to obtain above 800 differential measures between *Mars* and stars in the ephemeris sent you, besides meridian observations of the *N. A.* ephemeris also. . . . Brorsen's comet will be looked after as soon as it comes within striking distance of our

instruments: thanks to the copy of *Astr. Nach.* . . . I have thought for the last eight or ten nights that *η Argûs* is diminishing in brightness. It certainly is not brighter than the combined light of *α Centauri*, as it was again last summer; but the two are not yet favourably situated for comparison, being at unequal heights. . . . Can you not persuade one of your munificent patrons of astronomy to send his powerful telescope out here? I am convinced that it would unfold more wonders in physical astronomy *every year* than a lifetime would afford in your atmosphere."

Extracts of a Letter from Lieut. Gilliss, U.S.N., to Capt. Smyth.

"1852, *January* 20, *Santiago de Chile.*

"By the last mail from home, I received a copy of the 'Contributions to Astronomy and Geodesy,' forming part of vol. xx. *Mem. Ast. Society*, by Thos. Maclear, Esq. . . .

"You are probably aware it formed no part of my intention to re-examine existing catalogues, but to make a systematic sweep of the heavens from the pole towards the zenith, completing as much as possible in the time appointed for our stay in Chile. Each night's work is roughly compared with the catalogue to ascertain discrepancies of note, if any, and learn whether any star seen by others has been accidentally passed over. Subsequently becoming convinced that we must leave a belt of 25° between the zenith and pole unexamined, I devoted every Sunday night, when the assistants claimed holyday, to a search for those stars in Lacaille between the zenith and the upper zone, which had never been seen by any other observer. In this proceeding, a great many errors have been corrected, portions of which have been made known to astronomical friends from time to time, beginning with yourself, in July 1850, though whether any others have published them I have no means of knowing, Dr. Gould's journal having reached me very irregularly. Since the commencement of the series of observations on the planet *Mars*, my examination has, of necessity, been discontinued, and may not be resumed during the remainder of our stay here.

"I am glad to find that Mr. Maclear has confirmed the errors in the B.A.C. pointed out by our observations. There are one or two others in the same catalogue that are not mentioned by him, and I transcribe them from our note-book:—

No. 7619. There is no star in this position. Two, coinciding tolerably in declination, are in R.A. $21^h\ 43^m\ 0^s$ and $21^h\ 47^m{\cdot}0$ of the 10th and 9th mags. respectively.

7938. The proper motion in declination is not confirmed, and Lacaille is correct.

Errors in Lacaille's Catalogue.

No. 134. Polar distance, 10′ too great.

619. The nearest star so bright as 9th follows 30^s, and is 10′ north.

697. The nearest star to this position precedes it 35^s, and is 9′ south.

829. A double star follows this position 15^s and 8′ south, but there are no others.

No. 884. Not found when looked for, Nov. 9th, and Dec. 7th, 1851.
980. Does not exist here. I find 982.
1013. Right Ascension -10^s, Polar Distance $-4'$.
1094. The nearest star in this place follows 10^s and is $3'$ north.
1263. $2'$ too far south.
1283. } Two observations of these stars make their difference of R.A. $15^s{\cdot}33$,
1285. } and of P.D. only $8''$.
1295. Nearly $8'$ too far south.
1334. Does not exist.
1339. I could not perceive any nebulous portion with all light off.
1414. Near $3'$ too far south.
1545. $2'$ too far south.
1816. } There is only one star, and this corresponds with the R.A. of the latter,
1819. } whilst its P.D. is between the two.
7678. Polar Distance $3'$ too great.
8746. Does not exist.
9070. The nearest star is $8\frac{1}{2}$ mag., 26^s west, and $3'$ north of this place.
9232. The star we find precedes $1^m\ 10^s$, and is $2\frac{1}{2}'$ south of this.
9247. Not found in two searches.
9645. Polar distance $3'$ too great.
9734. The nearest star is 33^s following, and $4'$ south of this position.

"Whenever a discrepancy is detected by our observations, the star is noted in a book kept for the purpose, and made the subject of special attention, being usually observed twice afterwards; and though the errors above given you are only approximate, those who are compiling for a new catalogue may very safely mark those named to *be disposed of hereafter*. This list has not been communicated to any other correspondent.

"I very greatly regret to be obliged to acknowledge two errors in the ephemeris of *Mars*, which was sent to you before I left the United States. The places of all the stars within certain limits, or rather the catalogues containing these places, were given to the young officers who were to accompany us, that they might compute the corrections necessary. Although the computations were in duplicate, you see the result: Dec. 25th, a star has been given for comparison, just $20'$ off, and Jan. 15th, another precisely 1° off. On the former night I repeated the differentials with the star of the preceding night; but on the latter was obliged to content myself with meridian observations only.

"Besides the star of the special ephemeris referred to, at least one of those in the *Nautical Almanac* is also observed. So far the work has given me much satisfaction. On some nights I have obtained as many as forty differentials, showing the motion of the planet in every interval with far greater precision than was expected; and if observers in the northern hemisphere have been alike successful, our mission may not have been in vain. So far, the only cloudy nights in December were the 15th, 17th, 18th, and 23d; in January, the 3d and 18th. In the former month there were 365 differentials, and in this above 400.

"A reduction of 27 moon-culminations and two occultations, on the assumption that the tabulated places are correct, makes our observatory $4^h\ 42^m\ 18^s{\cdot}9$ West of Greenwich. There has recently been a survey between this city and Valparaiso, for the purpose of

locating a railroad; and the engineer, Allen Campbell, Esq., writes me, 'I am puzzled about longitude. I find that an air-line from Santa Lucia to Valparaiso does not exceed (by my survey) 64 English miles. Deducing the longitude of Valparaiso by this datum from your longitude, I make it only 71° 35′ 00″. Mr. Mowatt calls it 71° 40′ 30″, and by Capt. Fitzroy it is 71° 41′ 15″, making a difference between us of about 5 miles.' And, in a subsequent letter, he says, 'I have been over our work again, and we find it all right; so Valparaiso is undoubtedly farther east than Mowatt or Fitzroy make it. I am told old tables stated its longitude 71° 35′, and this would seem near the truth." A chronometer (pocket), which has been running very regularly, and brought here two days since, gives a difference of time $3^m\ 56^s{\cdot}1$, thus placing Valparaiso in $4^h\ 46^m\ 15^s$, if our longitude be correct. The same chronometer will be again transported in a few days, though too late for the result to be communicated in this letter. As the longitude of Valparaiso is of greater interest than that of any other point on the western coast, I have proposed to Señor Pissis, an engineer employed by the Chile Government to make a survey of the Republic, that we shall determine the difference of time between it and our observatory, by means of rockets and flashes of gunpowder. This will be carried into effect next month, there being a hill to the northward which is visible from both stations.

"Our geographical position has recently enabled me to observe two phenomena of more than ordinary interest, viz. two immersions and two emersions of η *Geminorum*, on the 5th inst., and an earthquake, under a magnifying power of 150, some nights afterwards; but my letter has already been extended beyond your patience perhaps, and I will not trouble you with them.

"The desire for information respecting the Wager has never been lost sight of; and the only person able to give any information has been talked with more than once. This is General Aldunate, formerly Intendent of Chiloe, but now Director of the Military Academy here. He seems to have no doubt that parts of the old ship would be found; but to do so, would require a special voyage, as the locality of the wreck is never visited. At the time of Capt. Fitzroy's survey, there was an old man on the island, who had assisted in removing a part of her guns, and with whom Fitzroy had a long conversation in the presence of the General.

"P.S. In my letter of July 28th, 1850, I find that an error of 2^m was made in giving you our longitude."

Extract of a Letter from Capt. W. S. Jacob of the Madras Observatory.

"I was quite unaware, until I saw it mentioned in the Annual Report for 1851, that the Lucknow Observatory was no longer kept up since the death of Col. Wilcox. It is my intention to act on the suggestion given in a note to the Report, that the Lucknow instruments might possibly be procured for Madras, and to apply

to the Government to that effect, as soon as I have ascertained from the Resident at Lucknow that the instruments are to be disposed of. I cannot, however, help thinking that Bombay would be a better place to transfer them to. There is there a better observatory than we have here, with no instrument except a 5-foot transit. The climate of Bombay is, astronomically, far superior to that of Madras, and I cannot but consider it very unfortunate that this place should have been pitched on as the site of the chief Indian Observatory, the climate being in my view very unsuitable; partly because from its relaxing nature few Europeans are able to keep up a prolonged series of observations without losing their health, and also because the amount of clear observing weather in the year is small compared with many other places in the country. Bombay is very superior in this latter respect; and I have no doubt it would be an advantage to science if that were made the principal observatory, and the astronomer located there instead of here, there being merely some one put in charge of the observatory here to give the time and rate chronometers, as is the case now in Bombay. An astronomer for each place would, of course, be better still, but of this there is little hope at present. Still better places than Bombay might be found, such as Poona, where the air is clearer and the climate less adverse to exertion; but to establish an entirely new station would involve a greater outlay in the way of buildings, &c., and would, therefore, be more difficult to accomplish. There is another point which I have to notice. In the same Report it is stated that application had been made to the East India Company, but without success, for the establishment of a large reflector on the Nilgherry Hills; this is a mistake. Will you, therefore, kindly correct this error by stating in the *Monthly Notices* that no direct official application has as yet been made to the East India Company on this subject? The Nilgherries would not, I fear, afford a good situation, as the proportion of cloudy weather there is nearly as large as here.

"My 2-foot speculum is, I regret to say, not in a very forward state. Our mutual friend, Capt. Worster, who had undertaken to make it, having, after two unsuccessful castings, been obliged by ill health and increased official duties, to lay it aside for a time: and within the last month he has gone to the Cape on sick leave for two years. He had succeeded with a third casting, and just commenced the rough grinding of it before he left. I am very doubtful of being able to complete it myself, my mechanical skill and experience in such matters being of very small amount. If completed, Poona would be the place to erect it at; there being no place of which I have any experience with so favourable a sky; it beats both the Cape and the Mediterranean entirely. But how that is to be done I do not see, for my private means are not sufficient to allow of my working it there on my own account, though, with a very little assistance, I would gladly do so, for here I feel myself to be of less use than I should like to be, and I do not think my health will enable me to hold out much longer."

On determining the Longitude at Sea from Altitudes of the Moon.
By Lieut. E. D. Ashe, R.N.

"In the August of 1849 I was invalided at Valparaiso, with a fracture of the thigh-bone, and was ordered a passage to England in the Pandora, surveying-vessel. During my leisure, my attention was drawn to the subject of longitudes, by the circumstance of one of the chronometers (which had gone well for four years) changing its rate very considerably without any assignable cause; and knowing what implicit confidence is placed in a good chronometer, I felt that it was to be lamented that there was not some plan less laborious and of easier attainment than the lunar distance for checking chronometers; for, notwithstanding my experience of more than twenty years' sea time, I can only recollect one instance of the chronometers having been checked by the lunar distance, which may be, perhaps, accounted for by the many inconveniences attending the observation, and the large amount of practice necessary to ensure success."

The data for the problem proposed by Lieut. Ashe are, the sidereal time of the observation, the latitude of the place, and the observed altitude of the moon.

Lieut. Ashe first computes the zenith distance of the moon on the supposition that the observer is on the meridian of Greenwich. As the Greenwich sidereal time is known, the arc of the equinoctial between the moon's node and the meridian may be computed from the *Nautical Almanac*, and the angle which the moon's orbit makes with the equinoctial may be assumed to be equal to the moon's greatest declination. Hence the solution of a right-angled triangle will give the arc *on the moon's orbit*, from her node to the meridian, or arc a; the arc on the meridian between the orbit and the equinoctial, or arc b; and the angle included between these arcs, or γ.

Again, if a perpendicular be let fall from the zenith upon the moon's orbit, the angle in this triangle opposite the perpendicular will be γ, and the hypothenuse is the latitude of the place when increased or diminished by arc b; hence the value of the perpendicular arc, d is found, and also the distance of the foot of the perpendicular from the meridian, e: the addition or subtraction of e to a gives the longitude of the foot of the perpendicular, reckoned on the moon's orbit from the node.

Finally, having the values of the perpendicular on the orbit, and of the moon's zenith distance calculated for the meridian of Greenwich, the third side is computed, which, when applied to the last found arc gives the longitude of the moon on her orbit reckoned from the node,* on the hypothesis that the observer is on the meridian of Greenwich at the sidereal time supposed.

Lieut. Ashe then assumes that the change of meridian from

* This arc might perhaps be computed less indirectly from the right ascension and declination of the moon.

Greenwich to the place of observation will not alter the relation of these circles to each other, and that the moon will merely occupy another situation in her orbit. As the zenith distance at the place of observation is supposed to be known, there are, in the right-angled triangle requiring solution, the perpendicular on the moon's orbit, and the observed distance of the moon from the zenith; and from these data the longitude of the moon on her orbit, reckoned from the node, is found for the time and meridian of the place. The difference of the two arcs thus found, divided by the moon's motion, will give the difference in longitude between Greenwich and the place of observation.

Lieut. Ashe suggests a second mode of determining the longitude by an altitude of the moon, when compared with an altitude of the sun or a star.

"For the sake of simplicity, take an example with a star.

"Let the altitude of a star near the prime vertical be taken, and compute its hour-angle. As soon after as may be convenient, take the altitude of the moon, and find her hour-angle; the elapsed sidereal time, and run of the ship (if necessary), being applied to the hour-angle of the star, the hour-angles of moon and star are known at the instant of last observation, and consequently the right ascension of the moon is known from the right ascension of the star. A simple proportion will show what is the Greenwich time corresponding to this right ascension of the moon.'

"When the observations are made on the same side of the meridian, an error in latitude, or instrument, or that caused by bad horizon, or refraction, or personal equation, will not materially affect the 'difference' of the hour-angles, since the errors are common to both triangles Z P S and Z P M, and both are augmented or diminished nearly alike; and therefore the 'difference' between erroneous hour-angles will be nearly equal to the difference between correct hour-angles."

Note. — The practical objection to using altitudes of the moon at sea, for getting the longitude, is, that the horizon is seldom so well defined as to allow of great accuracy, and that, unless the moon's orbit makes a considerable angle with the horizon, her motion in her orbit may not be shown satisfactorily by motion in altitude. The lunar distance observation is capable of much greater accuracy; and by using stars on both sides of the moon, a large portion of the necessary errors of observation are diminished: the motion in her orbit is more favourably shown. The calculations are by no means laborious or complicated; but it must be admitted that great nicety is required to make the observations well, and that the instrument must be of the best kind. On land, perhaps, lunar altitudes would be available in lowish latitudes, as the angle is doubled by the mercurial horizon, and the observation is easy and of great exactness. If a seaman wished to use altitudes of the moon as a coarse check on his chronometer, the easiest method would be to calculate the sidereal time, using the moon as a star, upon two approximate suppositions of the longitude. If that were pretty nearly known, a simple interpolation would show the true longitude; *i. e.* that which gives the true sidereal time, supposed to be already ascertained. But we should guess, in the absence of actual trial, that a very bad lunar distance would give more trustworthy results than a very good lunar altitude.—*Editor.*

On the Graduation of Circles. By Mr. R. L. Jones.

The principle proposed by Mr. Jones may, perhaps, be understood from the following description: the details would require a drawing.

The circle to be divided must have a permanent or temporary vertical axis on which it turns horizontally. A frame to which a telescope is attached, which also carries a steel straight-edge for drawing the divisions and a powerful microscope for viewing them when drawn, turns on the upper part of the axis. This apparatus can be clamped to the circle, and the circle can be clamped to a horizontal bed.

On a wall at some distance from the circle two dots are inserted, so that the angle between the dots shall subtend 90° at the centre of the circle. It will be seen that, by a process of *stepping*, not unlike observing with a repeating table, the circle can be divided into four *equal* arcs, and from the over or underlapping at the end, the correction of one of the dots, to make the angle *exactly* 90°, can be readily computed. These tentative fine divisions might be cut very lightly on a portion of the limb outside the final graduation. This correction being made, the accurate division into four arcs of 90° might be effected at once.

A similar proceeding would divide the circle into any number of aliquot parts. By an intermediate dot the arcs of 90° might be subdivided to arcs of 45°. Everything remaining steady, the bisection of a division by the microscope and of a dot by the telescope should always bring back the apparatus into a given state.

Mr. Jones proposes to set out at the same distance two points which subtend an angle of 1°; its truth can be proved and the error corrected by stepping from one of the divisions into 45° to another division. It would be easy to subdivide this degree into any required number of parts, as at the distance of about 100 yards, 60 inches subtend an angle of 1°. When this space was once ascertained to be = 1°, there would be no need of further experiments, as the position of the circle bed and the prototype division need not suffer any disturbance.

Mr. Cooper, of Markree Castle, County Sligo, exhibited a MS. sheet of the star-map now constructing by his astronomer, Mr. A. Graham, from the joint observations of himself and Mr. Graham. The scale is four times that of the celebrated Berlin charts. In the *Monthly Notice* for December last, p. 32, a description will be found of the manner in which the observations (on which the star-maps are founded) were made; and the beauty of the manual execution of the maps by Mr. Graham, corresponds with the excellence of the determination of the places of the stars.

In the brief notice of Professor von Boguslawsky, in the last Annual Report, a serious oversight was committed by the translator. It is said that the magnetical instruments of the Breslau Observatory were furnished by the British Government, at the recommendation of Humboldt and of the British Association. This is not correct. The instruments were presented by the British Asso-ation, *without any assistance from the Government*, and on their own knowledge. Neither did the series of observations begin so early as is stated, for the instruments were not sent till 1839. We are obliged to Colonel Sabine for these corrections.

Ready for the Press,

Cometic Orbits, with copious Notes. By Edward J. Cooper, Esq.

The object of the compiler of this work was to produce a catalogue of those comets whose orbits have been computed, together with such notes on their physical appearances, as should save astronomers the trouble of reference to a great many volumes of works written in different languages, and, in fact, prove a useful manual.

The catalogue will contain 198 distinct comets and 786 orbits. The volume will be printed and bound uniformly with the *Markree Catalogue of Stars near the Ecliptic*, and its price will be 5*s*.

The Royal Society takes sixty copies.

The attention of astronomers is particularly called to the following work, *The History of Physical Astronomy from the Earliest Ages to the Middle of the Nineteenth Century*, by Robert Grant, F.R.A.S., in 1 vol. 8vo. pp. 638.

Mr. Bishop presented a copy of the tenth hour of his ecliptic charts which has recently been engraved. It is exceedingly clear and distinct, and perfectly adapted to its object, namely, to facilitate the search for new planets.

Mr. Nasmyth suggests that all telescopic observations should be invariably accompanied with a notice of the focal length, aperture, and magnifying power of the telescope employed. If a uniform system were adopted, very little space would be lost even by a frequent repetition. The focal length and aperture might be in inches and decimals of an inch, thus: 42, 3·75; 80, would describe a $3\frac{1}{2}$-foot telescope, aperture $3\frac{3}{4}$ inches, and power 80.

On Luminous Meteor-like Bodies, telescopically visible in Sunshine.

By the Rev. W. R. Dawes.

The luminous bodies, which have been occasionally observed with a telescope in full sunshine, are so far astronomically interesting in consequence of their resemblance to meteors, as to render it desirable to ascertain their real nature; and with the hope of throwing light upon the subject, I beg to lay before the Astronomical Society a somewhat detailed account of some observations I made upon such bodies last autumn, under peculiarly favourable circumstances. Thinking that Mr. Read, who communicated his observations on some similar appearances in the autumn of 1850, might have had opportunities of repeating his examination of them in the course of last year, I postponed the communication of my observations, hoping that further light might have been thrown upon the subject by himself. As, however, he has, in the *Monthly Notice* for December last, only given a more full account of his observations of the previous year, I presume he has found no opportunity of repeating them.

On two or three occasions, during my residence at Cranbrook, I noticed similar appearances while observing in daylight, though never in such extraordinary numbers as Mr. Read saw them, nor as they were observed by myself last autumn. On previous occasions I had soon satisfied myself as to their real nature; yet, on the appearance of Mr. Read's account, I determined to take the first favourable opportunity of more carefully examining them, and noting down the particulars of the phenomenon. Such an opportunity occurred on the 9th of September, 1851.

The day was cloudless, the sun hot, the wind from about E.N.E., and dry. A little before noon, I was preparing to observe the sun with my $8\frac{1}{2}$-foot refractor; and while looking at it through the finder with a glass sufficiently dark to render the sun's light easy to the eye, I was surprised to see a bright object pass across pretty rapidly, nearly from east to west. In a few seconds another passed nearly in the same direction. Four or five more passed in quick succession, when Mr. Read's observation was brought to my recollection, and I determined to institute a careful examination of the phenomenon.

The brightness of the objects seemed very surprising, when it was considered that the sun was actually in the field of the finder, with a sufficiently dark glass applied, and yet they attracted my attention as they passed rapidly across.

Having applied a positive comet-eye-piece with a large flat field, and magnifying 65 times, I directed the telescope as near to the sun as my eye would bear without the defence of a dark glass, having previously adjusted the focus on the edge of the sun by the help of a dark glass, which was then removed. Immediately plenty of these luminous objects were seen, all passing nearly in the same direction, namely, from about E.N.E. to W.S.W.; but a few proceeded from N.E. or N.N.E. Some of them were much larger

than others; the largest being usually the roundest, and moving across the field in less time than the smaller ones, though, from their size and brilliance, it was easier to keep the eye upon them.

No obvious *phase* was visible in them, though they were not always of equal brightness in every part. Their brilliance greatly increased as the direction of the telescope approached the place of the sun; and though a dark glass of pretty deep tint then became needful to defend the eye, the objects were bright in the field, and they were the brightest when the sun itself was admitted a little way into the field, the dark glass being of sufficiently deep shade to permit the sun to be comfortably viewed through it. As a comparative standard of their brilliancy at a greater distance from the sun, I moved the telescope upon the planet *Venus*, which was then about 6° to the west of the sun. Plenty of the luminous objects passed through the field, and many of them were *much* brighter than the planet. On applying the dark glass with which I had seen them so well near the sun, *Venus* was totally hidden, as she was also with a far lighter shade of glass. The extraordinary increase of brilliancy which they acquire from being viewed nearly in the direction of the sun is thus made strikingly apparent. As the phenomenon was so well exhibited, I called out a member of my family to view it, who remarked that the objects looked very much like meteors. Some of them appeared larger than the planet *Jupiter* would do with the same power.

Having on former occasions ascertained that similar appearances were caused by *feathered seeds*, and especially those of thistles, floating with the breeze, and seen out of focus, I unclamped the circles of the equatoreal and moving the telescope freely with one hand, while the other was applied to the sliding adjusting-tube of the eye-piece, I was enabled to follow many of the most conspicuous of them, and to bring them correctly into focus. Their real nature thus became apparent. The largest were seen to roll over and over, and in some the feathery down was distinctly visible. The focal adjustment on the different objects varied greatly, showing that they were at very different distances; and in almost every instance the smallest were the most distant.

Between four and five o'clock in the afternoon, I varied my observation of them by bringing the sun into the south-west portion of the field, with a focal adjustment on the telescope considerably longer than was suitable for the sun. Many were still floating across, though I thought them less numerous than in the middle of the day. Several entered the north-east side of the field, and appeared extraordinarily bright till they passed on to the sun's disk, on which they immediately became dark spots, much like the third and fourth satellites of *Jupiter* when transiting his disk; but those which happened to be pretty correctly in focus were beautifully defined on the sun, and the feathered down of some of them more distinctly seen than in any other situation. From the differences observable among them, however, I think it probable that the seeds of several very different plants were floating together in the air,

besides those of various species of thistle (*Cnicus lanceolatus* and *Cnicus arvensis*), such as the seeds of dandelion, groundsel, and some kinds of willow (*Salix triandra* especially). It should be remarked that the weather had been for some time previously very dry and calm, and that on the day of observation a brisk air was stirring.

By screening my eyes from the direct rays of the sun, and looking steadily as near to the sun as the glare would permit, I could occasionally discern one or two sparkling points moving in the air; but in general they were much too high to be discerned without telescopic aid.

Though it is of course impossible to decide that these objects were of the same character as those observed by Mr. Read, yet the similarity of the phenomena seems to render it almost certain that they were so. In Mr. Read's communication the direction of the wind is not mentioned. That none of them should have been seen in the night renders their meteoric character highly improbable: had such a dense shoal of bodies so brilliant as those described either by Mr. Read, or in this paper, passed in the night, they would have sufficed to turn darkness into day. It is worthy of remark that Mr. Read's observations were made at almost precisely the same time of the year as my own; and I believe such an appearance will be seen only in the summer or autumn.

Letter from Lieut. R. Wilcox, R.N., Worthing, on a remarkable Appearance at Sunset.

"On the evening of April 8th, about 5 minutes after sunset, a red column arose from the place of the sun, and gradually ascended until it had attained a height of about 25° above the horizon; it there remained for 23 minutes and suddenly disappeared. The column had not a ray-like appearance as in the northern lights, but was of equal breadth from the base to the summit, and had the appearance of a bright red flame. I do not know if this appearance is very uncommon, but I have never happened to observe it before during a long service at sea."

Extract of a Letter from Mr. Spencer Hall to Capt. W. H. Smyth, R.N.

"As you think a few lines on the column of light seen at sunset on the 6th and 8th of April, may be of use in comparing statements, I am induced to trouble you upon the matter. I should state I was at Brighton for the recovery of my health, and that it was my constant habit to walk on the West Parade from 5·30 to 6·30 or 7 every evening. I was also in the habit of watching the sunset, for the purpose of comparing the real with the pictorial effects given by great artists, merely as a means of self-instruction.

I mention this to show how it was my attention was first directed, and then fixed, upon this appearance.

" I see, generally, that the appearance of the 8th inst. is only noticed. I am quite certain it appeared twice, and I believe this was also noticed in one of the *Times* letters. Now, as regards the time. The first lines of formation were about twenty minutes past six— the form itself remained on Thursday evening until after seven. It commenced as the sun declined. The wind was gentle, rather more north than east; and there was a hazy mist at sea and hanging about the horizon during the time. I do not think there was anything particular in the appearance of the accompanying clouds, except that I thought the glow of the sunset here was much ruddier than usual, more resembling the hue I have seen represented in the Panorama of the Nile, where sunset effect is attempted, than that golden, bright, luminous hue which flushes and fades in our horizon at that time.

" I cannot, unfortunately, draw, or I would send a coloured sketch, as I have the effect very perfect in my mind, and watched it closely. The column was directly over the sun, broader at the base, over the sun's disc, and slightly diminishing towards the top, not unlike a battledore with its head downwards, and a short broad handle. Whether the gradual diminution was real or no, I cannot say. It appeared so to me, but I judged this might arise, perhaps, from the upper part being less illuminated. It declined and faded gently into a pale yellow light from the top, diminishing from the top. It was brightest as the sun dipped below the horizon; and I think at that time the moon was at the full, and her light, it struck me, had some influence in graduating some of the sunset effects. But this must not be understood as a positive fact. On Thursday evening I watched the appearance more particularly. It differed from the first only in intensity and greater altitude. Towards seven, a cloud of fleecy brightness on its skirts crossed the column, and formed for a minute or two, as it sailed on, a fine cross.

" I have mentioned Tuesday evening as the first appearance of the column. I am positive it occurred twice; and as my memory is tolerably good, I do not think I shall mislead in fixing this as the day. With regard to time I did not note it by reference to my watch. My statement, therefore, must be read as that of limit between commencement and decay."

Extract of a Letter from W. S. Ayrton, Esq., to Capt. W. H. Smyth, R.N.

" The letters in *The Times* refer to a pillar of light seen to proceed from the sun on Thursday, the 8th of April. I did not observe the phenomenon on that day, but I witnessed its recurrence on Sunday, the 11th.

" On that day, just before sunset, I noticed a pillar of light

proceeding from the sun, and I at once devoted myself to observing it. After viewing this for about five minutes, I recollected that it might be important to fix the time, which I *then* found to be 10 minutes to 7; I think, therefore, that it was a quarter before 7 when my attention was first drawn to the fact.

"Upon subsequently inspecting the Registry kept at the Leeds Philosophical Society, I found the following entries made at 3 P.M. on the 11th:—

Barometer	30·154
Attached Thermometer	62°
Dry Bulb Thermometer	62
Wet Bulb Thermometer	59

Wind, South-east.

"The evening of the 11th was chilly, but very still. My house is situated about a mile and a half, in a direct line, N.N.E. of Leeds; and the smoke of that place formed an excellent screen, enabling me to view the sun without difficulty.

"The column of light proceeded directly from the sun, and was perfectly perpendicular to it. Of this I satisfied myself by referring to some tall chimney shafts in the neighbourhood of the column. It was at its base exactly of the diameter of the sun, and was very nearly, if not quite, of the same diameter throughout; perhaps not quite, but slightly enlarging as it proceeded towards the zenith; but this increase in diameter, if any, was very small.

"The light of the column gradually became fainter and fainter as it advanced towards the zenith, so that the exact line of its termination could not be defined.

"In order to form some conjecture as to its elevation and diameter, I held at arm's-length,—carefully noting the exact manner in which I held it,—a piece of pencil, which I have since measured and find to be $2\frac{1}{2}$ inches long, and $2\frac{1}{2}$ tenths of an inch diameter. This was held 34 inches from the eye, and then I estimated the height of the column of light to be twice the height of the pencil, and with regard to diameter, the pencil just covered the column. From these data its apparent dimensions in degrees can easily be ascertained.

"As the sun was setting I moved to the highest ground of the little park, in which my house is situated, and thence observed its setting without any intervening obstructions.

"I am quite certain that the column of light constantly appeared to proceed directly from the sun; that it was perpendicular, and continued so, and, as a consequence, followed the apparent solar motion.

"After the sun had set, the light appeared for some time to get brighter, and then gradually became fainter and fainter, till it was reduced to a mere blush. At half-past 7, all trace of the light disappeared.

"After the sun had set some time, the column appeared to sink

faster than seemed to agree with the rate at which the sun itself was sinking, and as if the column was undergoing a reduction in length.

" The light, at first, was of a faint yellow, with a tinge of pink. Afterwards the yellow hue gave place to the pink, the latter becoming rather deeper in colour; but this colour all through was faint, and partook of the general tint of the sky, or rather of the smoke and vapour of the neighbourhood.

" I have mentioned that the smoke of Leeds was interposed between myself and the sun. The light of the column was sufficiently strong to appear as if it cut through and divided the smoke; in other words, as if there was no smoke whatever in the space occupied by the column.

" A neighbour, Sir George Goodman, who lives about four miles north-west of Leeds, and on higher ground, observed this column of light with an addition of three cross-bars at the top. But of these no trace whatever was perceptible from my grounds."

Mr. Patrick Diggins, of Dunmore East, County Waterford, intimates that he has discovered " a new method of finding the latitude when the object is off the meridian;" the requisite data are " the apparent time from noon, and the latitude by account." No description of the computation is given.

Capt. Shea has furnished a continuation of his drawings of the solar spots. He remarks a particular arrangement on the 17th, 18th, and 19th of February, which he considers to have a strong resemblance to a ship.

Erratum in No. V.

Page 152, line 4 from the bottom, *for* 18″·61, *read* 28″·61.

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